



WORLDWINDS, INC.

The aftermath of Hurricane Katrina on the greater New Orleans area resulted in over \$81 billion in property damage. Since the U.S. government underwrites all flood insurance policies, months of subsequent debates occurred on whether destruction was caused by wind or water – because each fall under separate policies. The U.S. government uses specialized flood maps and computer models to assess risk and set premiums for flood insurance policies. Updates to the Gulf Coast maps and computer models were certainly needed after Katrina, and the ability to effectively and efficiently generate more accurate flood models became crucial.

PROJECT
Web-Based Hurricane Storm Surge and Flood Forecasting Using Optimized IFSAR Bald Earth DEMS

MISSION DIRECTORATE
Science

PHASE III SUCCESS
\$1 million in subcontracts with FEMA

SNAPSHOT
While developing specialized hurricane flood atlases for the coastal regions using space-based radar information under a NASA SBIR project, WorldWinds helps to develop new flood maps for FEMA post-Hurricane Katrina

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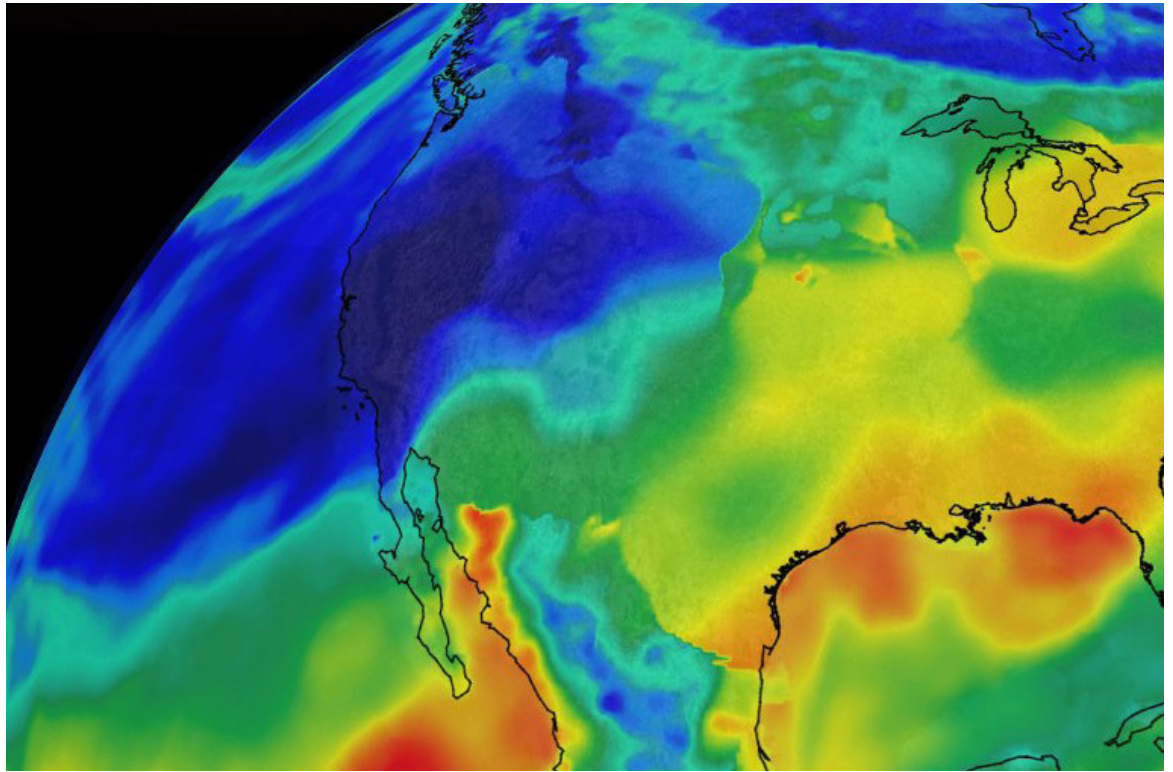
Three years prior to Katrina, a Mississippi-based small business, WorldWinds, Inc., was embarking on a Phase I Small Business Innovation Research (SBIR) project for NASA aimed at developing hurricane flood atlases for the coastal regions using space-based radar information. NASA had an interest in looking at hurricane storm surge forecasts using highly accurate digital elevation models to improve forecasting near coastlines; and WorldWinds' SBIR work centered on atlases that would include high-resolution storm surge simulations and rainfall effects. When Hurricane Katrina hit land, the need for such a technology was expedited, and suddenly WorldWinds was fulfilling demand across government agencies.

"We were working on our Phase II SBIR project with NASA, where we were applying the Interferometric Synthetic Aperture Radar (IFSAR) data from the space shuttle collection and developing high resolution storm surge atlases," explained Elizabeth Valenti, President/Owner at WorldWinds, Inc. "Toward the end of the Phase II project, Hurricane Katrina happened, and suddenly we were proving this process in real-time, in a brand new situation."

The work on the NASA SBIR project opened up the doors to working with the Federal Emergency Management Agency (FEMA) on a project called FEMA Risk MAP. Risk MAP provides high quality flood maps and information along with tools to better assess the risk from flooding and planning in an effort to reduce or mitigate flood risk.

PREVIOUS PAGE The aftermath of Hurricane Katrina on the Gulf Coast expedited a need for updated flood maps and corresponding risk. FEMA used WorldWinds' technology developed under the NASA SBIR program to update its Risk MAP across the region and other U.S. states

RIGHT WorldWinds is delivering commercial weather display products for TV broadcasters across the United States



WorldWinds' technology powers this map by running storm surge simulations for historical and hypothetical hurricanes. A 852 processor core supercomputer, one of the largest in Louisiana and located at WorldWinds' headquarters, is used for efficiently running the ADCIRC hydrodynamic model.

ADCIRC is a system of computer programs for solving time dependent, free surface circulation and transport

problems in two and three dimensions. WorldWinds' hydrodynamic model estimates the water level at each 30-meter grid point (on average) every 15 minutes, given the characteristics of a hurricane. Post Hurricane Katrina, new maps were produced for many southern states, while maps for other areas are in the process of being generated.

"The NASA SBIR program really opened up the doors for us to most of our other work with agencies and within the commercial sector," adds Valenti. "In Phase II, we learned how to use the storm surge model, and we were able to purchase the parallel processing supercomputer equipment required. That allowed us to do the processing work for FEMA, since they were looking for an existing capability. We had the personnel, the hardware

and the expertise for the Risk MAP project."

With its experience in developing and leveraging weather prediction and hindcasting services, WorldWinds has also found commercial success that has derived from its original SBIR-funded technologies. Using the same ADCIRC hydrodynamic modeling storm surge technology, WorldWinds is working with a private company to produce products that serve the TV weather broadcast market.

The company receives data from NASA and the National Oceanic Atmospheric Administration (NOAA) and processes this information around the clock by WorldWinds servers in 4 different states. After passing through WorldWinds' retrieval and processing algorithms, the results are formatted by Baron Services – a national weather forecasting service – and showcased on Baron's graphical display systems several times a day for use by client television stations across the United States, Canada and Spain, and most recently, by Accuweather's 24-hour weather news channel.

For NASA, the interest lies in understanding climate change and the rising sea levels. The agency is looking at potential increases in storm surges with the interest of protecting NASA infrastructure, both on the Gulf, and in communities where a risk may not have been previously anticipated. With offices at NASA's Stennis Space Center in Mississippi and Slidell, LA, WorldWinds is positioned to provide continued solutions to NASA's growing weather prediction needs both along the Gulf Coast and across the country.

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